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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/729,588

12/05/2003

Franz Cemic

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EXAMINER

CHU, RANDOLPH I

ART UNIT

PAPER NUMBER

2624

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/729,588	Applicant(s) CEMIC ET AL.	
	Examiner Randolph Chu	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9-30 is/are rejected.
- 7) ☒ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>8/4/2004, 7/14/2005</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

The drawings are objected to because *the unlabeled rectangular boxes shown in the drawings (Fig. 1 – Fig. 4) should be provided with descriptive text labels*. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 14 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Claim 14 and 16 recites the limitation "the generated image" in 4th line of claim 14 and 2nd line of claim 16. It is not clear whether the generated image is the generated reference image or the generated artificial ideal image.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 2, 4-7 and 9-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Nozaki et al. (US 6,504,947).

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With respect to claim 1, Nozaki et al. teaches
illuminating the object with a light source (laser) (Fig. 1 ref. no. 4, col. 6 lines 3-8);
imaging the object onto a detector using an imaging system so as to provide a
detected image (Fig. 1 ref. no. 4 and 5);
generating a reference image taking into account at least one property of the
imaging system (col. 4 lines 25-32);
comparing the detected image to the reference image (Fig. 1 ref no. 7 and col. 6,
lines 9-20); and
varying, upon a definable deviation between the detected image and the
reference image, the reference image so as to provide a varied reference image that at
least largely corresponds to the detected image so as to enable a drawing of at least
one conclusion regarding the object (col. 7 lines 18-34).

With respect to claim 2, Nozaki et al. teaches determining a localization (corner
section) of the object relative to a reference point (edge position) (col. 6, line 64 – col. 7
line 15).

With respect to claim 4, Nozaki et al. teaches the generating a reference image is
performed by generating an image characterizing the at least one property of the
imaging system (col. 4 lines 25-32).

With respect to claim 5, Nozaki et al. teaches generating the image characterizing the at least one property of the imaging system is performed by detecting a known object (actual image) with the imaging system (col. 4 lines 25-32).

With respect to claim 6, Nozaki et al. teaches detecting the known object is performed by detecting the known object at a plurality of angular positions in a plane of the object (col. 2, lines 1-5).

With respect to claim 7, Nozaki et al. teaches extracting an analytical function from a detected image of the known object, the analytical function characterizing the at least one property of the imaging system (col. 2 lines 32-40).

With respect to claim 9, Nozaki et al. teaches generating a reference image is performed by generating a function characterizing the at least one property of the imaging system (col. 2, lines 32-40).

With respect to claim 10, Nozaki et al. teaches generating a function characterizing the at least one property of the imaging system is performed by calculation or simulation (col. 2, lines 32-40).

With respect to claim 11, Nozaki et al. teaches that simulation is performed using an optics simulation program (col. 1, lines 27-35).

With respect to claim 12, Nozaki et al. teaches the generating a reference image is performed by generating using calculation or simulation an artificial ideal image (design data) corresponding to the object (col. 2, lines 32-40).

With respect to claim 13, Nozaki et al. teaches that generating an artificial ideal image is performed using a digital image processing method (col. 1, lines 22-26).

With respect to claim 14, Nozaki et al. teaches that the generating a reference image is performed by generating an image characterizing the at least one property of the imaging system and by calculation using the generated artificial ideal image and the generated image characterizing the at least one property of the imaging system (col. 2, lines 20-40).

With respect to claim 15, Nozaki et al. teaches that generating a reference image is performed by generating a function characterizing the at least one property of the imaging system and by calculation using the generated artificial ideal image and the generated function (col. 2, lines 32-40).

With respect to claim 16, Nozaki et al. teaches the calculation using the generated artificial ideal image and the generated image characterizing the at least one property of the imaging system includes a mathematical convolution operation (col. 2, lines 20-40).

With respect to claim 17, Nozaki et al. teaches the calculation using the generated artificial ideal image and the generated function includes a mathematical convolution operation (col. 2 lines 32-40).

With respect to claim 18, Nozaki et al. teaches storing the generated image characterizing the at least one property of the imaging system (col. 10, lines 40-46).

With respect to claim 19, Nozaki et al. teaches storing the generated function characterizing the at least one property of the imaging system (col. 8, lines 58-64).

With respect to claim 20, Nozaki et al. teaches storing the generated reference image (col. 10, lines 40-46).

With respect to claim 21, Nozaki et al. teaches the comparing the detected image to the reference image is performed using a computer and wherein the storing is performed so as to store the generated reference image on the computer (col. 10, lines

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40-46).

With respect to claim 22, Nozaki et al. teaches that the varying the reference image is performed by varying at least one of a feature and a shape of the object (col. 1, lines 62-67).

With respect to claim 23, Nozaki et al. teaches that the generating a reference image is performed by generating using calculation or simulation an artificial ideal image corresponding to the object and wherein the varying at least one of a feature and a shape of the object is performed by varying at least one of a feature and a shape of the generated artificial ideal image (col. 6, lines 9-20).

With respect to claim 24, Nozaki et al. teaches the comparing the detected image to the reference image is performed using a quality function (minimum value of the sum of the differences in the brightness between the actual image) (col. 7, lines 18-40).

With respect to claim 25, Nozaki et al. teaches the comparing the detected image to the reference image using a quality function is performed using numerical evaluation steps (col. 7, lines 18-40).

With respect to claim 26, Nozaki et al. teaches comparing the detected image to the varied reference image; and varying, upon a definable deviation between the

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detected image and the varied reference image, the varied reference image so as to provide a second varied reference image that at least largely corresponds to the detected image so as to enable a drawing of at least one conclusion regarding the object (col. 7, lines 18-34).

With respect to claim 27, Nozaki et al. teaches

a light source (laser) for illuminating the object (Fig. 1 ref. no. 4, col. 6 lines 3-8);

a detector (Fig. 1 ref. no. 4 and 5);

an imaging system for imaging the object onto the detector so as to provide a detected image (Fig. 1 ref. no. 4 and 5); and

a computer configured to: generate a reference image taking into account at least one property of the imaging system (col. 4 lines 25-32);

compare the detected image to the reference image (col. 6, lines 9-20); and

vary, upon a definable deviation between the detected image and the reference image, the reference image so as to provide a varied reference image that at least largely corresponds to the detected image so as to enable a drawing of at least one conclusion regarding the object (col. 7 lines 18-34).

With respect to claim 28, Nozaki et al. teaches the microscope (pattern inspection apparatus) is a coordinate measuring instrument (col. 3, lines 15-20).

With respect to claim 29, Nozaki et al. teaches that the microscope is capable of determining a localization of the object relative to a reference point (col. 6, line 64 – col. 7 line 15).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 3 and 30 are rejected under 35 USC 103(a) as being unpatentable over Nozaki et al. (US 6,504,947) in view of Jones et al. (US 7,085,431)

Nozaki et al. teaches all the limitations of claim 1 as applied above from which claim 3 respectively depend.

Nozaki et al. does not disclose expressly that detector includes a CCD camera.

Jones et al. teaches that detector includes a CCD camera (col. 1 lines 12-26).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use CCD as detector in the method of Nozaki et al.

The suggestion/motivation for doing so would have been that to digitize image efficiently at high speed.

Therefore, it would have been obvious to combine Jones et al. with Nozaki et al. to obtain the invention as specified in claim 3.

With respect to claim 30, please refer to rejection for claim 3.

Allowable Subject Matter

8. Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance: claim 12 is allowable over the prior art of record because none of the prior art of record teaches the combined claimed elements as set forth in the claim 8.

None of the prior art of record teaches or fairly suggests that analytical function that used to represent property of imaging system is symmetrical or asymmetrical Struve function, and together with combination of other claimed elements as set forth in the independent claim 8. Therefore, the claim 8 is over the prior art of records.

Conclusion

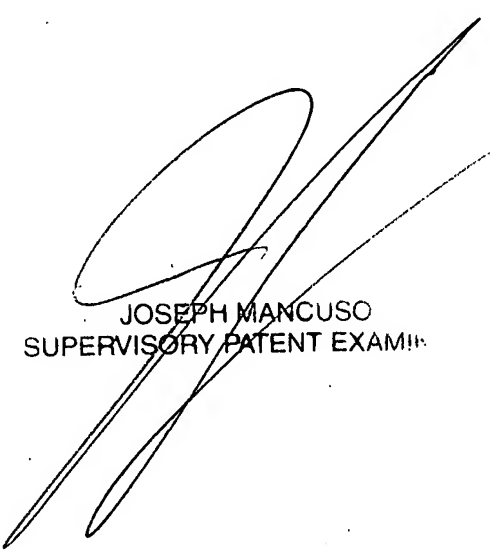
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Randolph Chu whose telephone number is 571-270-

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1145. The examiner can normally be reached on Monday to Thursday from 7:30 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso can be reached on 571-272-7695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RIC/



JOSEPH MANCUSO
SUPERVISORY PATENT EXAMINER